

Appl. No.: 10/670,144  
Reply to Office Action of: 11/12/2008

REMARKS

The examiner has noted that PCT/FI02/00234 filed 3/21/2002 has not been received. The present application is a continuation-in-part of PCT/FI02/00234 (and not a national stage filing). Therefore, because the present application is a CIP, applicants are not required to submit a copy of PCT/FI02/00234. The examiner can easily download a copy of the parent application.

Claims 1-2 and 4-6 were rejected under 35 U.S.C. §103(a) as being unpatentable over Campbell et al. (US 6,370,426) in view of Malicki et al. (US 4,918,375) and Zhao (US 5,833,686). Claim 3 was rejected under 35 U.S.C. §103(a) as being unpatentable over Campbell et al. (US 6,370,426) in view of Malicki et al. (US 4,918,375), Zhao (US 5,833,686), and Sherwin (US 4,640,290). Claims 7-10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Campbell et al. (US 6,370,426) in view of Amerena (US 4,860,753) and Zhao (US 5,833,686). Claim 11 was rejected under 35 U.S.C. §103(a) as being unpatentable over Malicki et al. (US 4,918,375) in view of Amerena (US 4,860,753) or Campbell (US 6,370,426). The examiner is requested to reconsider these rejections.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Claim 1 claims a method for measuring tissue edema wherein "an electromagnetic probe is placed on the skin during the measurement, and a capacitance of the probe is proportional to

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a dielectric constant of the skin and subcutaneous fat tissue, which is further proportional to a water content of the skin".

In contrast, Campbell merely discloses a method and an apparatus for measuring relative hydration of a substrate. The force applied to the substrate and the temperature of the substrate during the measurements is used to ensure proper results of relative hydration. As taught by Campbell, relative hydration is measured in the sense of impedance, and to be more specific, a capacitive reactance is measured. However, there is no mention of tissue edema in Campbell. Edema refers to a pathologic accumulation of fluid, and in general, edema relates to the accumulation of extra water in tissue.

The examiner admits that Campbell does not disclose the capacitance of the probe as proportional to the dielectric constant of the skin and subcutaneous fat tissue and proportional to the water content, and is silent to the frequency used.

Malicki et al. discloses a reflectrometric moisture meter for capillary-porous materials, especially for the soil. The measuring is made by using oblong dagger-like electrodes inserted into the soil (see col. 2, lines 11-12). As mentioned in the title of the patent, this meter is for the measuring of soil. There is no mention or description of measuring of the edema or measuring the skin. Applicants further submit that skin is not a capillary-porous material as described in patent of Malicki. In particular, Malicki teaches that the meter "can be applied for any such capillary-

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porous material which allows introduction of the probe in a non-destructive way ... [s]uch materials include: the soil, agricultural products (grain, hop cones, tobacco leaves, hay), food industry products (flour, bakery products), wood, moulding sand, subgrades, building foundations etc."

Zhao discloses an apparatus using frequency of 50 MHz. However, Zhao does not mention anything about measuring edema. Applicants disagree that Zhao teaches anything of penetration depth using the electromagnetic field of 50 MHz. Zhao describes that the ultra-high-frequency cosmetic apparatus is suitable for use in medical beauty treatment without any scarring and the restoration period after using the apparatus (see very short brief description in the abstract). All these descriptive facts indicate that the effective depth of the treatment must be very superficial.

Additionally, applicants submit that there is no suggestion to combine the references as the examiner is attempting to do (at least not until after reading applicants' patent application). In particular, Malicki teaches that the oblong dagger-like electrodes 1a, 1b, 1c, have lengths of 0.1 m, 0.25 m, and 0.5 m (see col. 6, lines 64-68). These large electrodes are inserted into the soil and each spaced several meters from each other (see Fig. 1). There is no disclosure or suggestion in Malicki of inserting the oblong dagger-like electrodes into the tissue edema of a person. Thus, it is clear that the teachings of Malicki are directed to industrial applications. Whereas, the teachings of Campbell are directed to measurements on human skin. Furthermore, Campbell does not disclose anything regarding the measuring depth or the

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dimension of the probe. The probe dimension has an influence on the measuring depth of the disclosed method.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. (see MPEP 2143.01, page 2100-98, column 1). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination (see MPEP 2143.01, page 2100-98, column 2). A statement that modifications of the prior art to meet the claimed invention would have been "well within the ordinary skill of the art at the time the claimed invention was made" because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references. (see MPEP 2143.01, page 2100-99, column 1) Ex parte Levengood, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). >See also Al-Site Corp. v. VSI Int'l Inc., 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999) (The level of skill in the art cannot be relied upon to provide the suggestion to combine references.)

In the present case, there is no teaching, suggestion, or motivation, found in either the references themselves or in the knowledge generally available to one of ordinary skill in the art, to provide an electromagnetic probe that is placed on the skin during the measurement, and a capacitance of the

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probe is proportional to a dielectric constant of the skin and subcutaneous fat tissue, which is further proportional to a water content of the skin as claimed in claim 1. The features of claim 1 are not disclosed or suggested in the art of record. Therefore, claim 1 is patentable and should be allowed.

Claim 5 claims "the edema of uppermost layers of the skin is measured using a frequency of approximately 20-50 MHz". Zhao merely discloses utilizing a UHF electric current of 50 MHz to perform cosmetic procedures. There is no disclosure or suggestion in Zhao of measuring anything, let alone measuring the capacitance of the electromagnetic probe, or measuring the edema of uppermost layers of the skin. The features of claim 5 are not disclosed or suggested in the art of record. Therefore, claim 5 is patentable and should be allowed.

Claim 6 claims "the edema of deep skin layers and the underlying subcutaneous fat is measured using a frequency of approximately 50-500 MHz". Similar to the arguments above, Zhao merely discloses utilizing a UHF electric current of 50 MHz to perform cosmetic procedures. There is no disclosure or suggestion in Zhao of measuring anything, let alone measuring the capacitance of the electromagnetic probe, or measuring the edema of deep skin layers. The features of claim 6 are not disclosed or suggested in the art of record. Therefore, claim 6 is patentable and should be allowed.

Though dependent claims 2-4 contain their own allowable subject matter, these claims should at least be allowable due to their dependence from allowable claim 1. However, to

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expedite prosecution at this time, no further comment will be made.

Claim 7 has been amended to clarify applicants' claimed invention. In particular, claims 9 and 10 have been canceled without prejudice and their features have been added to claim 7. Claim 7 claims "a high frequency unit for measuring the capacitance of the electromagnetic probe, wherein the high frequency unit is arranged to measure the capacitance of the electromagnetic probe at a first range of approximately 20-50 MHz, wherein the high frequency unit is arranged to measure the capacitance of the electromagnetic probe at a second range of approximately 50-500 MHz, wherein the first range corresponds to a measure of upper layers of the skin, and wherein the second range corresponds to a measure of deep layers of the skin".

Similar to the arguments presented above with respect to claim 1, Campbell fails to provide a teaching directed to measuring edema or the frequency used (as admitted by the examiner).

The examiner argues that Amerena discloses a probe used to measure the water content of skin comprising two concentric electrodes spaced in the range of 2-10 mm as an effective device for such purpose. Amerena discloses a probe to measure skin surface moisture content using a capacitive method. However, Amerena teaches that the probe measures only the skin surface (see abstract, line 4) and provides no teaching relating to tissue edema.

Similar to the arguments presented above with respect to claim 1, Zhao teaches to use a frequency of about 50 MHz. However,

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Zhao does not teach anything about measuring edema or an electromagnetic probe placed on the skin during a measurement. Instead, Zhao merely discloses utilizing a UHF electric current of 50 MHz to perform cosmetic procedures. Zhao describes that the ultra-high-frequency cosmetic apparatus is suitable for use in medical beauty treatment without any scarring and the restoration period after using the apparatus. All these descriptive facts indicate that the effective depth of the treatment must be very superficial. The teachings of Zhao are limited to cosmetic procedures. There is no teaching or suggestion in Zhao to measure anything, let alone measuring tissue edema and capacitance.

Even if, for the sake of argument, Zhao "is used to determine edema" (as argued by the examiner), there is no disclosure or suggestion of utilizing different frequency ranges for measurements corresponding to different layers of the skin. Zhao only teaches using the electric current of about 50 MHz to provide the cosmetic treatments. On the other hand, applicants' claimed invention provides for a first frequency range (20-50MHz) which corresponds to a measure of upper layers of the skin, and a second frequency range (50-500MHz) which corresponds to a measure of deep layers of the skin.

Additionally, applicants submit that there is no suggestion to combine the references as the examiner is attempting to do (at least not until after reading applicants' patent application). In the present case, there is no teaching, suggestion, or motivation, found in either the references themselves or in the knowledge generally available to one of ordinary skill in the art, to provide a high frequency unit for measuring the

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capacitance of the electromagnetic probe, wherein the high frequency unit is arranged to measure the capacitance of the electromagnetic probe at a first range of approximately 20-50 MHz, wherein the high frequency unit is arranged to measure the capacitance of the electromagnetic probe at a second range of approximately 50-500 MHz, wherein the first range corresponds to a measure of upper layers of the skin, and wherein the second range corresponds to a measure of deep layers of the skin, as claimed in amended claim 7. The features of claim 7 are not disclosed or suggested in the art of record. Therefore, claim 7 is patentable and should be allowed.

Though dependent claim 8 contains allowable subject matter, the claim should at least be allowable due to dependence from allowable claim 7. However, to expedite prosecution at this time, no further comment will be made.

Claim 11 claims "placing an electromagnetic probe on the skin ... transmitting a first portion of the first signal to the probe and through the skin and subcutaneous fat tissue ... receiving a reflected signal from the skin and subcutaneous fat tissue through the probe ... operating the phase detector in a saturated state, wherein signal amplitudes from the reflected signal and the second portion of the first signal form the saturated state ... and calculating a water content of the skin based on the dielectric constant".

Similar to the arguments presented above with respect to claims 1 and 7, neither Malicki, Amerena, nor Campbell provide a teaching or disclosure relating to measuring tissue edema.

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In particular, Malicki et al. discloses a reflectrometric moisture meter for capillary-porous materials, especially for the soil. The measuring is made by using oblong dagger-like electrodes inserted into the soil (see col. 2, lines 11-12). As mentioned in the title of the patent, this meter is for the measuring of soil. There is no mention or description of measuring of the edema or measuring the skin. Applicants further submit that skin is not a capillary-porous material as described in patent of Malicki. In particular, Malicki teaches that the meter "can be applied for any such capillary-porous material which allows introduction of the probe in a non-destructive way ... [s]uch materials include: the soil, agricultural products (grain, hop cones, tobacco leaves, hay), food industry products (flour, bakery products), wood, moulding sand, subgrades, building foundations etc.".

Applicants submit that there is no disclosure or suggestion in the art of record of operating the phase detector in a saturated state. Applicants note that the examiner has not pointed out any prior art reading on this feature of the invention.

Applicants further submit that there is no suggestion to combine the references as the examiner is attempting to do (at least not until after reading applicants' patent application). For example, Malicki teaches that the oblong dagger-like electrodes 1a, 1b, 1c, have lengths of 0.1 m, 0.25 m, and 0.5 m (see col. 6, lines 64-68). These large electrodes are inserted into the soil and each spaced several meters from each other (see Fig. 1). There is no disclosure or suggestion in Malicki of inserting the oblong dagger-like electrodes into

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the skin of a person. Thus, it is clear that the teachings of Malicki are directed to industrial applications. Whereas, the teachings of Amerena and Campbell are directed to measurements on human skin.

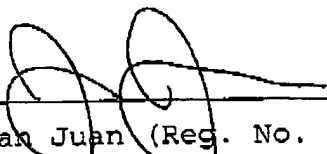
In the present case, there is no teaching, suggestion, or motivation, found in either the references themselves or in the knowledge generally available to one of ordinary skill in the art, to provide the method as claimed in claim 1. The features of claim 11 are not disclosed or suggested in the art of record. Therefore, claim 11 is patentable and should be allowed.

Claim 12 has been added above to further claim the features recited therein.

For all of the foregoing reasons, it is respectfully submitted that all of the claims now present in the application are clearly novel and patentable over the prior art of record. Accordingly, favorable reconsideration and allowance is respectfully requested. If there are any additional charges with respect to this Amendment or otherwise, please charge deposit account 50-1924 for any fee deficiency. Should any unresolved issue remain, the examiner is invited to call applicants' attorney at the telephone number indicated below.

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Respectfully submitted,

  
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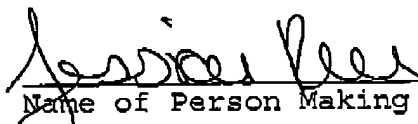
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